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IN TWO SECTIONS

Section I

N.A.C.A. LIBRARY

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EDITORIAL DEPARTMENT NOTE

We are always interested in what the other fellow is doing. Every subject becomes more interesting as we progress from the statement of general principles to the application of these principles to a specific situation. Articles dealing with such specific applications, often called case studies or case histories, have appeared frequently in the N. A. C. A. Bulletin. Many of these articles have dealt with the application of standard cost principles. But we feel no hesitancy in presenting in this issue of the Bulletin another case study dealing with standard costs, for we feel that our readers will find the present exposition by George N. Benoit, of our Springfield Chapter, both interesting and instructive. Mr. Benoit was educated at Northeastern University and holds the B. C. S. degree from that institution. For eight years after his graduation he was employed as an industrial accountant by the Fisk Rubber Co. Next followed a year of public accounting, and three years on the accounting staff of the Westinghouse Electric & Manufacturing Co. For the last ten years Mr. Benoit has been Supervisor of the Cost Department, of Gilbert and Barker Manufacturing Co., West Springfield, Mass. He is at present Director of Employment for our Springfield Chapter.

The second article in this issue also deals with standard costs. It is a presentation of the advantage and disadvantages of current or ideal standard costs as compared with basic standard costs. The author of this article is Francis I. Heinen, whose education in the field of accounting has been gained through eight years of private tutoring, extension and summer school work. Beginning college with the idea of preparing for the profession of dentistry, Mr. Heinen entered the newspaper field to gain resources to continue his education. A chance association with a successful practitioner of public accounting led to an interest in newspaper accounting. His interest in this field has continued, and he is at present Auditor of the Freeport Journal-Standard Publishing Co. of Freeport, Ill. Mr. Heinen is at present Director of Program for our Rockford Chapter.

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NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

DECEMBER 1, 1935

SETTING STANDARD COSTS IN A METAL-WORKING PLANT

By George N. Benoit, Supervisor, Cost Department, Gilbert & Barker Manufacturing Co., West Springfield, Mass.

THE standard cost system, parts of which are about to be described, is used in a plant whose manufacturing and assembly problems are similar to those of an automobile company, but the accounting and control problem is complicated by three separate factors:

1. The fact that we make five distinct lines of products, one of which consists of many different specialties.
2. An annual change of models in two of the lines.
3. The fact that, although we are geared up for mass production, quite frequently, even in the production of our standard lines, we have to accept the grief that goes with job shop methods.

I will spend no time preaching the gospel of standard costs because by this time the advantages of standard costs are already well established in the minds of nearly every member of the Association. My subject also will not include standard costs as applied to distribution expenses or the projection of variations in profits or losses. I also believe you would be more interested in the ***how*** of our standard costs rather than the why. I have, therefore, developed a specific standard cost with a set of hypothetical figures and will build my article around that standard factory cost.

What We Expect of Standard Costs

In general we expect the same results from our standard costs as other companies who use them. We expect our standards to:

1. Provide the information with which selling prices are compared.
2. Provide inventory values.
3. Provide the management with a method of measuring and controlling factory and sales operating efficiency.

In order to accomplish these purposes the cost department has the following functions:

1. Making preliminary cost estimates.
2. Establishing standard costs, new and revised.

3. Making special cost comparisons and analyses.

4. Preparing information for selling prices of new equipment, repair parts, special apparatus and castings, and sometimes establishing selling prices subject to approval of the management.

5. Preparing vouchers to account for changes in inventory accounts resulting from changes in standard costs and estimated cost of sales.

6. Maintaining complete selling price records.

Our cost department has other duties, including pricing customers' orders, checking of billing, and pricing all inventory ins and outs; but, as they are not strictly of a cost department nature and usually are performed in other divisions, I will not touch upon them further.

The Product Described

Just a word about the product whose cost we are discussing. If you refuel your car at a modern service station equipped to comply with the most rigid rules of both the Underwriters' Laboratories and Sealers of Weights and Measures and if the equipment is of the most modern type, the gasoline is dispensed through an electric computing meter pump. The general specifications of the machine might be listed as follows:

> Rotary pump with in-built filter, of non-corrosive internal parts, driven by an explosion-proof ¼ to ⅓ horse power motor.
>
> Displacement piston type meter with a computing mechanism which registers the price per gallon, the gallons delivered and the value in dollars and cents of the sale.
>
> A mechanism which separates air from the gasoline.
>
> A device to indicate that the gasoline is flowing from the meter through the hose to your car.
>
> Necessary piping, electric and operating devices.
>
> A chassis with housing which we think is beautiful.

Certain customers, particularly in the foreign field, require an auxiliary hand attachment to provide for the possible failure of the electric current. Because this hand attachment has few but varied parts, I have chosen it as our sample standard cost.

Exhibit 1 at the end of this article is a photograph of a blueprint for R-4093, hand drive support and pulley assembly. This not only will give you an idea of how the apparatus looks but it

also shows the general design and exact location of the parts whose costs, with two exceptions, will be shown in detail. In addition to the drawing of the assembly R-4093, its component parts are illustrated on individual drawings and listed on a bill of material. This is, of course, simply standard practice as carried out in most modern mechanical plants today.

Foundry Costs

Some time ago we were asked by the Gray Iron Founders' Society if we had installed the Uniform Cost and Estimating System as recommended by that Society and if not, why not. Part of our answer might have been as follows: "We have not installed the Uniform Cost and Estimating System because we believe that our Standard Unit Cost System combined with an actual lot-order cost system, both of which we have operated for several years, supply the same information as would the Uniform System, but more promptly and accurately."

We believe that Exhibit 2 might serve as a valuable bit of evidence to support our contention. It is a foundry unit standard cost of N-7551-X, hand drive pulley.

The material cost of the casting, which is the cost of the poured metal, is the product of its weight and the standard cost per pound of the poured mixture from which it is made. How this standard cost per pound is arrived at is quite a subject in itself and time will not permit of our going into it. In this case, it happens to be $.017 per pound. The standard weight, 7 pounds multiplied by $.017 gives a standard unit material cost of the casting of $.119, which you will find posted in its space in the lower right corner.

Standard Labor Costs Under a Standard Time and Bonus System

Our standard labor costs are built upon our standard time and bonus system. A standard time based on time study is allowed for each operation and bonuses on hourly base rates are paid at varying degrees of efficiency. In the foundry we expect that labor will be 100% efficient. In the factory we base our standards on an average efficiency of 95%.

The standard times allowed for each operation are stated on what we call a bonus chart which is simply a contract between

the operator and the company stating the time allowed per unit of production and the bonuses which will be paid at the varying degrees of efficiency. If you will refer to the Foundry Casting Cost for hand drive pulley number N-7551-X, you will observe that the bonus chart for molding allows 4.34 minutes. The bonus chart for shaking the casting from the mold allows .86 minutes and the sum of the charts for cleaning is 1.76 minutes. These minutes are converted to hours, the standard labor rate for each department is posted in the space provided, the standard times and standard rates multiplied and a standard labor cost of $.089 is arrived at. The standard burden cost is arrived at in the same manner.

The sum of the material, the labor and the burden gives a total cost of $.377. For each casting, number N-7551-X produced in the foundry, process material accounts are credited $.119, direct labor accounts are credited $.089, burden accounts are credited $.169 and the storehouse account for gray iron castings is charged $.377. As these castings are drawn from the storehouse and moved to the machine shop, a requisition is written and the inventory account is credited $.377 and the process account charged $.377 for each casting moved.

Setting Labor Rates

A word about rates should be said at this point. Standard rates for labor and burden are arrived at, usually at the first of each year, in the conventional manner.

In the case of labor, total direct pay rolls departmentalized, divided by total direct hours, gives the average actual labor rate for any given department. This actual rate for the previous year modified by a rate of reduction or increase contemplated in the following year becomes the standard labor rate per man-hour for the period and department under consideration. For example, let us assume in Department "A" that our pay roll records for 1934 reveal the following information:

Direct Man-Hours 122,000.

Direct Labor Pay Roll $90,000.

$90,000 ÷ 122,000 = $.738, average rate per man-hour; and that a general increase of 5% to compensate for higher living costs is contemplated. Then 105% of $.738 = $.775. We would make

our standard labor rate for Department "A" $.78 per hour for 1935.

Setting Burden Rates

Before standard rates for burden are established a careful forecast of production is broken down into departmental man-hours. How this breakdown is made is illustrated near the end of this discussion. From the number of expected man-hours by departments it is possible to budget the elements of variable expense and determine the expected unabsorbed burden. This might be illustrated as follows:

Total (irreducible) non-variable expense..... a
Total budgeted variable expense..... b
Total forecast of productive man hours..... c
Total normal productive man hours..... d

$\frac{c}{d}$ times a plus b, divided by c or

$$\frac{\frac{ca}{d} + b}{c}$$ equals standard burden rate

We appreciate, for example, that an automatic screw machine operator has a higher earned rate than a drill press hand and that on theory alone, it is incorrect to group these men in the same department as we do. We also appreciate that the equipment and power factor for a heavy punch press and for a hand-bending brake are quite different. If we were a jobbing shop and we were selling the product of an individual machine we would naturally hesitate to quote from costs computed with grouped departmental rates. However, our departments are separated both as to kind of product and equipment used and we have found from practice that when the final cost of the complete piece of apparatus is computed, we get little or no difference whether we break down our departments any finer or not.

Standard Operation Costs for a Unit Part

Exhibit 3 (front and reverse) of the sample standard cost carries over the standard casting cost already computed and shows the cost of machining the pulley. As you will observe, on the re-

verse there are five different operations shown. The "D" group is considered as one department.

In the case of machining or assembly operations, these are listed for each part or piece of finished apparatus on what we call an operation sheet. When this operation sheet is typed, a carbon copy is made on the back of our standard cost form. This saves writing by a cost man and also places the responsibility for the correct operations and standard times being used for standard costs in the engineering department where it properly belongs. I should say in passing, however, that a good cost man does not accept an engineering routing or standard time as the final word. He is expected to use some judgment and to question any method or standard time which does not appear to be efficient or economical.

This operation sheet states the work to be done, the standard time which will be allowed to do it, the machine on which it will be done and usually the set-up which will be allowed for each order. There are occasions when for one reason or another, no bonus chart has been established for an operation. In those cases, an estimate is made of the time and this becomes the basis of the standard cost. This estimating can be done to a remarkably high degree of accuracy because of elemental standards built up from the experience of our time-study engineers and records of machine speeds and feeds.

The man-minutes are added and summarized by departments, divided by .95 and the set-up is added to this total. In this case production is quite small, 100 per order. The total standard set-up in department "D" is 510 minutes, which divided by 100 gives a unit set-up time of 5.10 minutes. These man-minutes are converted into hours, multiplied by the standard rates and the labor and burden cost are found in the same manner as in the case of the casting.

Exhibit 4 of your sample standard cost is for the hand drive support. The blueprint and the bill of material indicate that this part is made of seven gauge hot rolled steel 4" wide and 18¾" long and that 84 can be made from a sheet 48" wide and 133" long.

Accounting for Standard Material Costs

As production material or parts are purchased, a block is stamped on a copy of the invoice and the following information

posted thereon: The standard cost per unit, the total standard cost which is the product of the unit standard cost and the quantity purchased, the actual cost which is the amount of the bill less cash discounts plus freight and the variance (debit or credit) which is the difference between the standard purchased cost and the actual cost. This variance is accumulated on a side record and accounted something as follows:

Inventory accounts are charged at standard cost. As the inventory accounts, largely by accident and partly by design, are divided by the product into which the purchased part will be assembled eventually, the side record of variance by inventory accounts can be vouchered monthly to cost of sales accounts which in turn are divided by kinds of product. I imagine that there are tax-minded accountants or textbook theorists who might question this procedure. I might add that we violate neither tax laws nor accepted accounting practice.

What we are interested in for the moment is how the standard cost is arrived at. We are, of course, a metal working shop and the sheets, bars and plates of steel that we use in our product have their base prices quoted weekly in either *The Iron Age* or other metal trade journals. The first of each year our entire storehouse inventory is reviewed and the standard costs per pound or per piece are established, based on public knowledge, contracts with our vendors and the ability of our management, including the purchasing and cost departments, to prognosticate.

Illustrating the Calculation of Material Standards

All purchased material variances as reflected on the face of invoices are reviewed and approved in the cost department and wide differences are noted. If the conditions warrant, standards are changed and the storehouse accounts adjusted. Why this check is made in the cost department can be brought out by further considering the case of the sheet of steel from which N-7387-X is made.

As hereinbefore stated, the bill of material specifies the use of a sheet 7 gauge, which converted to the U. S. Standard Weight Gauge thickness is .1838" thick, 48" wide and 133" long. The base price today of sheet steel is $1.85 per hundred weight. According

to the table of "extras" published by the American Iron and Steel Institute, 7 gauge is a base gauge, 48" is a base width and 133" is a base length. Therefore, if we were buying this sheet in Pittsburgh the price would be $.0185 per pound. But as we are to use it in Springfield we must add $.0038 per pound for freight which gives a total of $.0223 per pound. But we use and cost this sheet by the piece, which is a very important point to bear in mind.

Tables of weights for this class of sheet indicate that it will average to weigh 7.497 pounds per square foot. 48" by 133" equals 44⅓ square feet which when multiplied by 7.497 pounds gives a standard weight per sheet of 332.36 pounds. Multiplying this standard weight by the standard cost per pound of $.0223 arrived at above we get a standard cost per sheet of $7.41. This is the standard unit cost with which the invoices are priced. Inasmuch as we are billed by the pound, the variance reflected on the face of the invoice may consist of two factors: 1. a variation in price and 2. a variation from standard weights. If there is no price variation, and the invoice still shows a variance, then the steel mill has rolled the sheets too heavy which is to their advantage, of course. As a matter of fact, we are able to control purchasing policy to a large extent by comparing the weight variances of various suppliers. We find that some mills are able to roll closer to our specifications than others. Those other mills, of course, are the ones we try to avoid as a source of supply.

Some Advantages of this Method

There are other incidental advantages to handling material purchases in this manner. We have an added check on vendor's billing and on purchasing department's price checking. Let us suppose that we buy an electrical fitting for $1 list less 30 and 20%. If this is the first purchase and it is agreed by the purchasing department that future purchases will be on the same basis, the standard unit cost becomes $.56. Let us suppose that the next billing is at $1 less 30 and 10%. Either the vendor has made a mistake, and billing clerks can make them, and our purchasing department under pressure of routine has passed the invoice, or insufficient quantity was purchased to entitle us to the additional 10% discount. The *difference* becomes very conspicuous because

it is computed on the face of the invoice. After all standard costs are justified by the law of exceptions.

We have computed the standard cost of the sheet in question at $7.41. As one sheet will make 84, the standard unit material cost of N-7387-X becomes $.088 and is so indicated.

Exhibits 5, 6 and 7 which are standard costs for K-47399-X, K-47403-X and K-47402-X respectively, have been covered in principle by the discussion of the two previous standard costs.

Making the Necessary Allowances

I would like to pause for a moment, however, and discuss the method used and the basis for the standard unit material cost for K-47399-X covered by Exhibit 5. This is made from Riverside Bronze, 1⅛" in diameter and 3" long, cut off included. This is a comparatively expensive material and the control of production costs becomes proportionately more important.

Available to the members of the organization is a *Book of Standards,* one page of which is entitled "Cut Off and Bar End Allowance." This page states that a bronze bar 1⅛" in diameter cut off on a screw machine may require a cut off tool 3/16" wide. This 3/16" added to the finished length of the piece, 2 13/16", gives 3", which is indicated under "Material Specifications" on the standard cost. This same page also states that bars 1⅛" in diameter cut off on a hand screw machine will require a loss of 1" per bar for chucking and squaring the end which loss is called "Bar End Loss."

Ten feet or 120" minus 1" equals 119 inches, divided by 3" equals 39; $11.78, the cost of a 10' bar, divided by 39 equals $.302, the unit standard material cost.

If the operator is wasteful of this material, or if he uses a wider than standard cut-off tool to gain speed for his operation, the excess material consumed will be reflected on the actual cost. How this is discovered will be discussed later.

In order to facilitate the work of computing material costs, tables were prepared showing costs per bar or strip of various kinds of steel and brass and the face of the standard cost form was so prepared as to indicate the method of computing the unit material cost. As base prices are changed it is a relatively simple

matter to change these tables which are produced by the hectograph or mimeograph process. In other words, we have reduced the clerical work necessary to compute a unit material cost by standardization of methods within the cost department.

The "cost per 10 feet" in the case of K-47403-X and K-47402-X is obtained from a set of these tables in the hands of each cost man.

Exhibit 8 is the standard cost we have been approaching. You will observe at the bottom a heading "Standard Parts Summaries." Here are posted the material, labor, and burden costs and the standard man-hours for its component parts plus the standard cost of the parts purchased. The sum of these component costs becomes the standard material cost of R-4093. In other words, for each R-4093 produced there is moved from stores to the assembly department $3.694 worth of parts.

When we add the labor and burden costs for assembly arrived at in the same manner as the previous standard costs, we get a total standard factory cost of $3,756.

Standard and Lot-Order Systems Combined

As these lot orders are closed, which means computed and retem in conjunction with our standard cost system. For the purposes of this discussion it suffices for me to state that as production orders are issued, a serially numbered lot-order folder is written in the planning department, which states the description and the quantity to be produced of the part, sub-assembly or complete apparatus. The folder provides space for pricing with the standard unit cost, a summary of the total "actual" cost, the total standard cost and the variance.

The total "actual" material cost is the sum of the priced and extended requisitions for material and/or parts which have been charged to the lot order, the price on the requisitions being the standard unit cost of the material or parts. The actual labor cost is the product of the actual hours spent on the order and the standard labor rates. The actual burden cost is the same departmental hours multiplied by the respective standard burden rates.

The total standard cost is the product of the number of units produced and the unit standard cost, split into material, labor and burden.

The variance is the difference between the total "actual" cost and the total standard cost, again split into material, labor and burden.

We appreciate that this so-called actual cost is not an actual cost as commonly understood. It is in fact a hybrid, but we feel we should not sacrifice practicability for the sake of correct academic terminology.

Variances and Their Causes

As these lot orders are closed, which means computed and recapitulated, they are examined in the cost department. Any orders reflecting unusual variances are analyzed, and the causes for the variance reported to the proper division of the factory management. The kinds and causes of variance, or in other words, the elements of excess cost, are the same in our company as in any other. A few of them are excess set-up, low labor efficiency, machine substitution, defective material, defective workmanship, and poor supervision. Of course, these variances are the exception rather than the rule. The important point is that our combined standard cost and lot-order system makes it possible for these variances to be discovered at all in the first place, and promptly enough to be of value to the shop management in the second place. After the orders showing unusual variances are analyzed in the cost department they are turned over to the proper foreman with written comments.

What we have done is to build up a standard cost of a subassembly and to indicate as we went along some of the uses to which that standard was put. The principles involved in establishing the standard cost of the gasoline dispensing, motor driven, computing meter pump are the same. There being many more parts, it is necessary to list them on a different form, which we call a blanket requisition.

The Blanket Requisition

It is interesting to trace the origin of the name of that form. When our standard cost system was first installed this blanket requisition was what its name actually implies. The parts were copied from the bill of material for each model number, costed and

summarized as to the inventory account from which they would be withdrawn (the credit side of a journal entry) and for process accounts to which they would be moved (the compensating debit side of the same entry). It was found after a short while, however, that there were so many and frequent deviations from the bills of materials, because of changes in design, cost reductions, material or part substitutions, it was impossible to maintain the kind of inventory control the management in its wisdom considered necessary. The material movement and accounting feature of the blanket requisition was abandoned, therefore, but the form was retained and revised and now provides the following information:

1. Name, symbol and quantity of parts required per unit.
2. Unit and extended value of parts.
3. Description and value of painting and crating material.
4. A total and summary of these values indicating the amount each process account should be credited per unit produced.
5. A distribution or breakdown of these values into material, labor and burden.
6. The number of direct man-hours by departments required to produce the parts.
7. The standard labor and burden cost to assemble, paint and crate the pump.
8. The number of direct man-hours to perform the final assembly, paint and crate.
9. The sum of 4 and 7, which is the standard cost of the pump.
10. The sum of 6 and 8, which indicates the total direct man-hours by departments to produce one pump.

Much of this information is statistical, but nonetheless valuable. When you observe the use to which we put items 5 and 10, I think you will agree.

Let us assume that we have a sales forecast of

5,000 ..... Pump Model 100
4,000 ..... Pump Model 200
6,000 ..... Pump Model 500

and that our standard cost records reflect the following information:

					Direct Man-Hours			
	Mat.	*Labor*	*Bur.*	*Total*	*Dept. A*	*Dept. B*	*Dept. C*	*Dept. D*
Model 100	$40	$20	$35	$95	10	5	5	10
Model 200	50	25	40	115	15	5	5	15
Model 500	10	5	10	25	2	1	2	3

We may then arrive at the following figures:

	Number	Total Standard Cost			Direct Man-Hours				
	Forecast	Material	Labor	Burden	Total	Dept. A	Dept. B	Dept. C	Dept. D
Model 100	5,000	$200,000	$100,000	$175,000	$475,000	50,000	25,000	25,000	50,000
Model 200	4,000	200,000	100,000	160,000	460,000	60,000	20,000	20,000	60,000
Model 500	6,000	60,000	30,000	60,000	150,000	12,000	6,000	12,000	18,000
		$460,000	$230,000	$395,000	$1085,000	122,000	51,000	57,000	128,000

Budget Information Obtained

If the entire sales forecast is broken down in the manner illustrated there is available the following elements of a budget: 1. Cash required to finance purchases of production materials and direct labor pay rolls. 2. Expected burden absorption at present standard rates. 3. Expected direct man hours which, with item 2 may indicate the amount of excess plant capacity or that standard burden rates should be revised.

I could tie in this phase of our standard cost system with my previous brief description of how we arrived at standard labor and burden rates, add to the combination a lengthy study of burden distribution and application and finish up with a text book which would add little to current literature on accounting subjects. Our topic comprehends no such treatise, however.

Before closing I should like to add a word about the blanket requisition form itself. The original purpose of this form, which was to control the moving and accounting for parts between stores and the manufacturing floor, I think was ideal. The writing of as many as 400 requisitions in some cases might be saved. We hope that some day our product will be standardized enough to return to that particular use of the form.

We know that our system is not perfect, but we think we are aware of most of the defects. For example, we do not get the variance reports in the hands of shop department managers soon enough after the performance of the work. We can curtail the process accounting paper work. We believe we can correct these defects and others; but, as is well known, major reforms cannot be accomplished overnight in a relatively large organization.

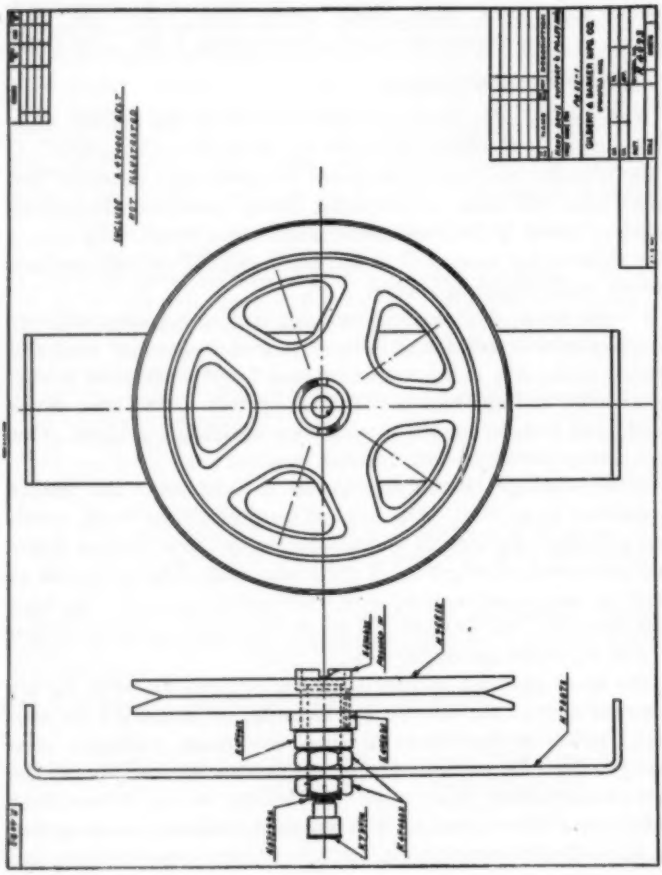

EXHIBIT 1

FOUNDRY CASTING COST Form CAB 4386 GILBERT & BARKER MFG. CO.

Name Hand Drive Pulley Symbol N7551X

Size of Flask 12"X12"X8" Steel Pieces per Flask 1 Number of Cores per Piece None

Oper. No.	Operation Elements	Dept.	Bonus Chart	Man Minutes	Man Hours	Labor Rate	Burden Rate	Material
	Make Core	413E						Kind Grey Iron
	" "	413E						
	" "	413E						
	Assemble and Paste Cores	413E						Weight 7.#
	Mold. Light Machine	411E	54857	4.34	.072	.85	1.50	
	" Heavy "	409E						Cost per Pound .017
	" Bench "	412E						
	" Floor "	410E						
	Shakeout	417E	16769	.86	.014	.65	1.25	
	Blast	414E						
	Grind	414E	54857	.45				
	Air Chip	414E	54858	1.31				
	Hand Chip	414E						
				1.76	.029	.65	1.50	

Pattern and Core Box Equipment			
Description	Cost		
		MATERIAL COST	.119
		LABOR COST	.019
		BURDEN COST	.169
		TOTAL COST	.377
		COST PER POUND	.054
		SELLING PRICE	Per Pound / Per Piece

EXHIBIT 2

GILBERT & BARKER MFG. CO. Sht. No. ... of ... Shts

STANDARD COST RECORD-Parts SYMBOL N7551X

Name Hand Drive Pulley Dr. Pro. Acct.

Type PA 35-1 Cr. Inv. Acct.

Description Lot Order No.

Quantity

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED DATE
Standard MATERIAL Cost	377			
Standard LABOR Cost	225			
Standard BURDEN Cost	413			
Standard FACTORY Cost	1015			

Date		Material Specifications	Unit Weight	Cost Per Pound	Pieces Per	Cost Per Piece	Standard Mach. Cost
1/2/35		Grey Iron Casting	7.#				377

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept.		Hours	Labor Rate	Labor Costs	Burd. Rate	Burden Costs	Hours	Lab. Rate	Labor Costs	Burd. Rate	Burden Costs
1/2/35	17		2.42	75		1.50						
	138½		.045	80		1.00						
	176		.010	75		.50						
TOTALS					225		413					

STANDARD PARTS SUMMARIES

Nº Req.	Symbol	Man Hours	Acct. Nº	M or P	Original Date Matl.	Labor	Burd.	Total	Revised Date Matl.	Labor	Burd.	Total
	TOTALS											

EXHIBIT 3

OPERATION SHEET — Gilbert & Barker Mfg. Co.

CONT. STYLE _____ CONT. CAP _____ ROUTING FOR SYMBOL M7551X

ECONOMICAL RUN _____ TYPE PA 35-1 NAME HAND DRIVE PULLEY

FINISHED SIZE	MATERIAL	PRO ACT	ORDER FROM STORES TO MAKE ONE: LBS.	PIECE	UNIT SIZE STORES	ORDER IN MULTIPLES OF	SHEET NO. _____ SHEETS
	CAST IRON						

OPR. NO.	DEPT. NO.	OPERATION ELEMENTS	BONUS CHART NUMBER	BONUS CLASS	100% EFF. MAN-MIN.	MACH. GROUP	MACHINE SET UP MAN-MIN.
5	144D	Turn O.D., Face, Groove, Drill, Bore, Ream and Face and Turn Hub to 1-5/32" Dia.	Cat		6.04	P&J	180.00
10	146D	Broach Keyway	A6349	5	.72	Broach	30.00
15	135Y	Finish turn Hub to 1.125-1.126	Cat		2.00	Lodge & Shipley	60.00
20	153D	Wash	Cat		.18		
25	176F	Prime	A6366	6	.224	Chain	7.00

Dept	Est/M/M	@95%	Set up/M	Total	Est/Piece
D	8.94	9.39	5.10	14.49	.242
135Y	2.00	2.10	.60	2.70	.045
176F	.224 (8 mins)	.47	.16	.62	.010

TOTALS

OP.	%	GAUGES & INSPECTION	OP.	%	GAUGES & INSPECTION

DATE															
ROUTED OR REVISED BY															
APPROVED BY															

EXHIBIT 3 (REVERSE SIDE)

GILBERT & BARKER Mfg. Co.

STANDARD COST RECORD - Parts

Sht. No. ___ of ___ Shts.

SYMBOL N7387X

Name: Hand Drive Support

Type: PA 35-1

Description:

Dr. Ro. Acct.:

Cr. Inv. Acct.:

Lot Order No.:

Quantity:

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED RATE
Standard Material Cost	.088			
Standard Labor Cost	.059			
Standard Burden Cost	.143			
Standard Factory Cost	.290			

Date	Material Specifications	Unit Weight	Cost Pound	Pieces per Heat	Cost per Heat	Standard Matl. Cost
1/2/35	Hot Rolled steel 7 Ga. (.1852) x 4" x 18¾" One Unit 4⅜" x 13⅜" makes 84			84	74.10	.088

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept.		Hours	Labor Rate	Labor Costs	Burd. Rate	Burd. Costs	Hours	Lab. Rate	Labor Cost	Burd. Rate	Burden Costs
1/2/35	110A		.059	.75		2.00						
	291W		.013	.75		1.50						
	D		.002	.75		1.50						
	164F		.005	.75		.50						
Totals					.059		.143					

STANDARD PARTS SUMMARIES

Nº Req.	Symbol	Man Hours	Acct. Nº	M or P	Original Date Matl.	Labor	Burd.	Total	Revised Date Matl.	Labor	Burd.	Total
	TOTALS											

EXHIBIT 4

GILBERT + BARKER MFG. CO.

STADARD COST RECORD - Parts

Name Hand Drive Pulley Stud

Type PA 35-1

Description

Set. No. ... of .... Sets.

SYMBOL K47399X

Dr. Pro. Acct.

Cr. Inv. Acct.

Lot Order No.

Quantity

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED DATE
Standard MATERIAL Cost	302			
Standard LABOR Cost	119			
Standard BURDEN Cost	239			
Standard FACTORY Cost	660			

Date		Material Specifications	Unit Weight	Cost Per Pound	Pieces per 100 Feet	Cost per M. Pcs.	Standard Mat'l Cost
1/2/35		Bronze Bar 1¼ Dia X 3" Lg (cut off included)		.33	39	11.781	3 02

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept.		Hours	Labor Rate	Labor Costs	Burd. Rate	Burden Costs	Hours	Lab. Rate	Labor Costs	Burd. Rate	Burden Costs
1/2/35	D		159	75		1.50						
TOTALS					119		239					

STANDARD PARTS SUMMARIES

No Req.	Symbol	Man Hours	Acct No	M or P	Original Date Mat'l	Labor	Burd.	Total	Revised Date Mat'l	Labor	Burd.	Total
	TOTALS											

EXHIBIT 5

GILBERT + BARKER MFG CO. Sht. N° .... of .... Shts.

STANDARD COST RECORD - Parts SYMBOL K47403X

Name Hand Drive Ratchet Bushing Dr. Pic Acct.

Type PA 35-1 Cr. Inv. Acct.

Description Lot Order N°

Quantity

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED DATE
Standard MATERIAL Cost	.030			
Standard LABOR Cost	.172			
Standard BURDEN Cost	.334			
Standard FACTORY cost	.536			

Date		Material Specifications	Unit weight	Cost per Unit	Prices per 100 Pcs		Cost per 100 pcs	Standard Matl Cost
1/2/35		Cold Rolled Steel - 1½" Rd x 1¾" Lg (at offset)			67		2.013	.030

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept.		Hours	Labor Rate	Labor Costs	Burd. Rate	Burden Costs	Hours	Labor Rate	Labor Costs	Burd. Rate	Burden Costs
1/2/35	D		.208	.75		1.50						
	1364		.017	.70		1.00						
	2918		.069	.75		1.50						
TOTALS					.172		.334					

STANDARD PARTS SUMMARIES

N° Req.	Symbol	Man Hours	Acct N°	M or P	Original Data Matl.	Labor	Burd.	Total	Revised Date Matl.	Labor	Burd.	Total
	TOTALS											

EXHIBIT 6

Gilbert & Barker Mfg. Co.

STANDARD COST RECORD - Parts

Sht. Nº of Shts.

SYMBOL K47402X

Name Hand Power Lock Nut

Type PA 35-1

Description

Dr. Pro. Acct.

Cr. Inv. Acct.

Lot Order Nº

Quantity

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED DATE
Standard Material Cost	.006			
Standard Labor Cost	.043			
Standard Burden Cost	.086			
Standard Factory Cost	.135			

Date		Material Specifications—	Unit Weight	Cost per Pound	Pieces per 100 Pounds	Cost per 100 Pieces	Standard Matl. Cost
1/2/35		Cold Rolled Steel 1¼" Dia. x 7/16" Long Cut off in Lab			270	1.589	.006

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept.		Hours	Labor Rate	Labor Costs	Burd. Rate	Burd. Costs	Hours	Labor Rate	Labor Costs	Burd. Rate	Burd. Costs
1/2/35	D		.057	.75		1.50						
TOTALS					.043		.086					

STANDARD PARTS SUMMARIES

Nº Req.	Symbol	Man Hours	Acct. Nº	M or P	Original Data Matl.	Labor	Burd.	Total	Revised Data Matl.	Labor	Burd.	Total
	TOTALS											

EXHIBIT 7

GILBERT • BARKER MFG CO. Sht. No ... of ..... Shts.

STANDARD COST RECORD-Parts SYMBOL R4093

Name Hand Driver Assembly Dr Fin Acct

Type PA 35-1 Cr Inv Acct

Description Lot Order No

Quantity

STANDARD COST SUMMARY	ORIGINAL DATE 1/2/35	REVISED DATE	REVISED DATE	REVISED DATE
Standard MATERIAL Cost	3 694			
Standard LABOR Cost	036			
Standard BURDEN Cost	026			
Standard FACTORY Cost	3 756			

Date		Material Specifications	Unit Weight	Cost per Unit	Pieces per Unit	Cost per Piece	Standard Mat'l Cost

STANDARD LABOR and BURDEN SUMMARIES

Date	Dept		Hours	Labor Rate	Labor Costs	Burd Rate	Burden Costs	Hours	Lab Rate	Labor Costs	Burd Rate	Burden Costs
1/2/35	177F		051	70		50						
TOTALS					036		026					

STANDARD PARTS SUMMARIES

No Req	Symbol	Name	Man Hours	Acct No	M or P	Original Date 1/2/35 Mat'l	Labor	Burd.	Total	Revised Date Mat'l	Labor	Burd.	Total
1	N7551X			451	M	377	225	413	1015				
1	N7287X			451	M	088	059	143	290				
1	KW7399X			451	M	302	119	239	660				
a/ 1	KW7509X			451	M	001	011	021	033				
1	KW7403X			451	M	030	172	334	536				
1	KW7400X			35	P	750	"	"	750				
2	KW7402X			451	M	012	086	172	270				
a/ 1	KW7401X			451	M	025	034	068	127				
1	KW71X			35	P	013	"	"	013				
	Assembly			451									
						1598	726	1390	3694				
	* Not Machined												
	TOTALS												

EXHIBIT 8

STANDARD COSTS: CURRENT VS. BASIC

By Francis I. Heinen, Auditor,
Freeport Journal-Standard Publishing Co., Freeport, Ill.

AN EXAMINATION of the word "standard" reveals at once that it may, and commonly is, taken and used in three different senses in the course of a single discussion. For example, a standard system may be under review. Let us say that it has been set up by a trade association for the guidance of the members. In this connection, the term stands for a model or type. If standard costs are a part of the accounting scheme, two further considerations are apparent. The question has to do with the type of standard cost system. The first plan which one may consider may well be what is called the current or ideal standard system. In other words, the standards may be looked upon as being what the actual costs *should be* as worked out by engineers and accountants. On the other hand, the standard cost may not be a cost at all! It may be only an initial formula—basic, and used to measure trends, etc., though capable of being adjusted to current price levels by the application of correction factors, and of being used as a starting point in estimating, pricing, budgeting, etc.

In this manner we have arrived at the point where we may consider the two great concepts, fundamental to the setting up of a standard cost plan for any business. The old job-order cost system, not without its value in calling the attention of the management to the cost factors involved in the manufacturing processes, was found to be too wasteful of human effort and to require too much analysis *after* the assembling of the final figures for a given period, while in the end, it furnished no more than a historical record, and has given way to a new and scientific procedure. The question is now, not whether a given industry can use standard costs, but whether it shall attempt to keep its standards in "ideal figures," frequently revised, or on the basic plan without revision of the standards themselves except at such times as the manufacturing processes are altered.

The Current Standard Cost Plan Considered

There seems to be little question as to which plan of standard costs finds most favor at first blush. There is an inescapable appeal

to a standard which represents a goal to be attained, or "something to shoot at." Such a standard is not the par of the golf course, however. It must be set so as to be attainable by the exercise of ordinary skill. When standard costs are used to express what products should cost, inventories of work in process and finished stock are carried on the books at standard cost, and differences between the actual costs and the current standards are diverted to variation accounts standing as a direct charge to profit and loss. If carried out to the fullest extent, the procedure under the plan may call for the setting aside at the time of purchase of raw material, any variation between the price paid and the expected current price of the product. Since the theory is that the standard costs are the justifiable costs, and deviations are the result of some form of inefficiency, it logically follows that no variation should be set up as a current asset by being included in inventories. Ordinarily, however, profits are not anticipated, should the variations arise from bettering the standards and consequently prove profitable. In this connection, it is usual to treat individual gains as off-sets to individual losses.

It is apparent at once, that under the above plan, continual revision of the standards in all phases of the work is a matter of prime importance, and one of the serious disadvantages of the plan. It not infrequently happens that the human appeal of the current standard plan results in the adoption of this system but the practical difficulties in the way of keeping the standards abreast of the rapid changes in prices of materials and labor rates, soon result in a condition where the standards are not strictly current nor, having been occasionally revised, do they afford a fixed basis for calculating true standards.

Also, the practice of disposing of all variations at the end of each month, through a charge to profit and loss, or as a deduction from "normal" gross profits, gives rise to another difficulty because of the lack of uniformity between production methods by which it is hoped to iron out much seasonal fluctuation.

Thus the charge off of variations might be expected to be heaviest during the months when the profits were least. Further there is the question as to whether all the variations represent true inefficiencies. Are not some of the so-called inefficiencies merely

losses which might be considered a normal and inseparable part of the manufacturing processes? The latter seems like a reasonable question and needs to be carefully considered.

None of the disadvantages of ideal or current standards costs appears, however, to be insurmountable and need not deter their adoption whenever it is believed that the particular processes of a given industry permit the file of standards to be kept really current and usable under ordinary conditions.

While the detailed accounting technique of the two plans cannot be gone into in this paper, it might be noted here that the current standard plan does not call for the introduction of parallel accounts or the carrying of "dual figures" as is customary under the basic cost plan. It will be contended of course, that the necessity for frequent revision of the curent standard costs entails a great amount of clerical labor which would easily off-set the above slight advantage.

The Basic Standard Cost Plan Considered

Under the basic cost plan, as we have said, the standard cost of an article is not a real "cost." It is a formula which requires adjustment, the nature of which depends upon the purpose for which it is to be used. When costs are based upon a reasonable, normal average it is a comparatively easy matter to make comparisons between actual cost of production and expected cost or to carry out a large number of other calculations regarding trends, etc., all without changing the standards which remain as a basis for the reckoning.

The standards are used as a basis and not as a "real" cost, inventories of work in process and finished goods are carried at the actual costs and the corresponding standards are carried beside them in parallel columns as previously stated. Whenever goods are sold, the accounts are then credited at actual costs and the corresponding standards, of course, are dropped. Under the basic plan only unabsorbed burden is carried apart as a variation. This has the effect of setting up the cost of production at actual instead of what it "should have been."

It will be apparent from the above that the disadvantages of the current or ideal plan can be obviated by the adoption of a system which operates on the metric or measurement principle as in-

dicated above. The latter method, while it does, as critics are wont to note, call for double computations in that the basic standard is first determined after which it is adjusted to current price level, or in whatever way may be desired, also, at the same time, makes it possible to handle such adjustments *only in totals,* so that the labor is actually less than where a large file of standards must, itself be changed.

Burden Under the Two Plans

While, under either plan, unabsorbed burden is carried as a variation so that when a plant is operating at less than a fair degree of capacity, the goods manufactured under such conditions do not appear to have been turned out at an excessive cost, an important difference in the two usual plans is to be noted. Under the current plan, the burden absorbed for a given production is the same regardless of operating effectiveness. Under the basic plan the amount absorbed is computed on the basis of the hours actually run so as to be influenced by the manufacturing efficiency. The first system simply sets down what the burden "should be"; the latter introduces another element which is designed to show "what the real cost was." So many variations in cost accounting procedure are met in actual practice, however, that the above should not be taken as representative of what takes place in all plants.

It should be made clear here that under the basic plan, burden rates are kept at an unchanged standard, as are the material and labor rates and the rate which is to be used to determine the actual burden to be absorbed on the basis of the hours run, is obtained by adjusting the basic rate to current price levels. The calculation of absorbed burden is thus on the same basis as to price level under either plan, but with the difference in procedure noted in the preceding paragraph.

How Often Should Standards Be Changed?

An important consideration is the question of how often standards should be changed. This is of greatest significance, of course, in connection with the current or ideal standard cost plan. Generally speaking, standards should be adhered to for the longest possible period. Executives and others whose duty it is to digest

the reports have a chance to become familiar with the cost data and the confusion attendant upon the rapid changing of the standards is avoided. Minor fluctuations can usually be safely disregarded, for it is the very purpose of the standard plan to call attention to such changes. In many cases, standards, even under the current plan, can remain unchanged for an entire year. Some firms go over their standards every three to six months. Each case must be decided on its merits. This is another way of saying that common sense must prevail in this matter as in all phases of costing procedure, for the latter is not an exact science.

Choosing a Plan

Here the writer is reminded of what a farmer said about choosing a breed of chickens. "Get something you like," he advised, "cause if you don't, they ain't goin' to get the right amount of care." While perhaps business is run on a different principle, it would not be surprising if that advice were found to have an element of truth applicable to this situation.

Where the operations are simple, the two plans are found to have a smaller degree of divergence and the problem is simplified. In more complex situations, it is possible that purchase contracts and production schedules still make it possible to adopt either plan with small difference in actual operation. It may be that the basic plan wins on logical grounds. It can do all that the current plan can do, all the while possessing advantages of its own. But it is novel, comparatively, and it is new and it may be that even scientifically minded industrialists will long look askance at it. Further, since the beginnings of scientific management the word "standard," as was indicated in the first part of this article, has stood for something akin to par. Lastly, it may be that quibbling over method is academic. It is important that industrailists are thinking and that industrial policies are gradually being redeemed from guess work. To this work standard cost systems under either plan have contributed the psychological power of definite goals. As John Dewey said: "Men don't shoot because targets exist, but they set up targets in order that shooting may be more effective."

BIBLIOGRAPHY

SETTING STANDARD COSTS

N. A. C. A. Publications:

Determination of Labor Standards for Cost and Wage Incentive Plans. W. L. Walker, W. H. Conn, and W. F. Hosford. 1928 Year Book, pp. 41-93.

Development of Standards for the Control of Manufacturing Operations. Irvin Gerofski and C. W. Avery, 1931 Year Book, pp. 96-107.

How to Set Standards. Special N. A. C. A. Publication. Herbert J. Myers, William Keating, and J. C. Metsch. June, 1931, 98 pp.

Installation of Standard Costs. Herbert J. Myers. Bulletin I, August 1, 1931.

Setting Standards for Plating and Japanning Costs in a Job-Order Industry. Rodolph H. Redmond. Bulletin I, March 1, 1934.

Setting the Standards. P. J. Warner, J. P. Jordan, J. A. Willard, H. C. Greer, and C. L. Kingsbury. 1929 Year Book, pp. 143-218.

Standard Costs—How to Get Them. William F. Worrall. 1926 Year Book, pp. 147-91.

(Note: A complete bibliography of all phases of standard costs will be found in the Topical Index of October 15, 1932, and the Supplement of October 15, 1934.)

BULLETINS PUBLISHED SINCE AUGUST, 1935

The Social Security Act and Its Problems for Management	September 1, 1935
The Control of Marketing Costs Through the Use of Standards	September 15
Control and Distribution of Selling Costs	September 15
Practice in Accounting for Returnable Containers	October 1
Mechanical Check Writing	October 1
Some Aspects of Inter-Unit Accounting Methods	October 15
Plant Equipment Forms	October 15
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The Application of Tabulating and Accounting Machines to Real Estate and Mortgage Accounting Procedure	November 15
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